OPERATION
AND
SERVICE MANUAL
T.O.S. NO. 6

MODEL CDH-10.0MHZ-X1
PLUG-IN HARMONIC MARKER

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WARRANTY

TELONIC INSTRUMENTS AND ACCESSORIES

Products manufactured by TELONIC INDUSTRIES, INC. are guaranteed against defective materials and workmanship for a period of one year (vacuum tubes excepted) from date of purchase. This warranty does not apply to instruments that have been altered, improperly handled or damaged in any way beyond our control.

Instruments must be examined immediately upon receipt, since claims for damage in transit will not be honored by the carrier unless prompt action is taken.

CHANGES IN SPECIFICATIONS

The right is reserved to change the published specifications of equipment at any time, and to furnish merchandise in accordance with current specifications, without incurring any liability to modify equipment previously sold.

RETURNING EQUIPMENT TO FACTORY

Factory service is available for repair and readjustment of this instrument. However, a description of the trouble, plus the MODEL AND SERIAL NUMBERS of the unit should be forwarded FIRST, whereupon instructions for correcting the trouble OR authorization for returning the equipment will be given. This applies to all units, whether under warranty or not.

TABLE OF CONTENTS

Section		Page
I.	GENERAL INFORMATION	1
	1-1. Specifications	1
	1-3. Description	1
II.	INSTALLATION	1
	2-1. General	1
III.	MAINTENANCE	2
	3-1. General	2
	3-4. Troubleshooting	2
IV.	PARTS LIST	4
	4-1. General	4
	4-2. Electrical Parts List	4

LIST OF ILLUSTRATIONS

Figure		Page
1.	Schematic	2
2.	Waveforms	3

LIST OF TABLES

Table		Page
1-1.	Specifications	1
4-1.	Electrical Parts List	4

SECTION I

GENERAL INFORMATION

1-1. SPECIFICATIONS.

1-2. Table 1-1. lists the specifications for the CDH-10.0 MHz-X1 HARMONIC MARKER.

TABLE 1-1.

Specifications	
Crystal Accuracy	± 0.005%
Frequency Range	Fundamental to 1000 MHz
Marker Width	100 to 400 KHz (Adjustable by the Sweep Generator Marker Shaper Control)
Marker Amplitude	Over 0.1V peak to peak at 1000 MHz (Adjustable at Marker Size Control on Sweep Generator)
Voltage Requirements	B+ 100V regulated dc Filaments 6.3V ac

1-3. DESCRIPTION.

1-4. The Telonic CDH HARMONIC MARKERS are crystal-controlled plug-in units for use with Telonic Sweep Generators. The marker frequency can be identified by the numerals following the letters CDH.

1-5. These units consist of a Pierce Crystal Oscillator, a harmonic generator, a mixer, and a video amplifier; all contained in one "plug-in" unit occupying two marker sockets on the Telonic Sweep Generators. The output from the oscillator is fed to a two stage harmonic generator and then to a dual diode mixer where it is combined with a signal from the sweep oscillator. The resultant heterodyne signals or "beats" are then amplified in a video amplifier and fed through a low-pass filter to the Birdy-By-Pass Amplifier in the Sweep Generator.

1-6. The crystals used in this unit are manufactured specifically for the associated oscillator circuitry. Proper allowance has been made for the capacitance of the crystal holders and other reactive properties of the oscillator section.

1-7. The dual diode mixer circuit is engineered for harmonics of nearly constant amplitude over the entire range. High order harmonics sufficiently strong for a clear marker up to 1000 MHz are available from all these units.

SECTION II

INSTALLATION

2-1. GENERAL

2-2. This plug-in unit can be inserted in any two of the eight plug-in sockets, built-in on all Telonic Sweep Generators, that will provide a termination for the sweep sample input and output connections. The sweep sample input (BNC jack) can be fed from either one of two sweep sample lines in the unit or from the sweep sample output of an adjacent plug-in unit. The sweep sample output (BNC plug) should be connected to either one of the two BNC terminators on the chassis or the sweep sample input of an adjacent box, to provide a 50 ohm matched termination.

SECTION III

MAINTENANCE

3-1. GENERAL.

3-2. Maintenance of the CDH HARMONIC MARKERS will normally be limited to replacement of component parts worn out in normal use or damaged by overload, accident, etc. Since there are no adjustable components used in this unit, the major cause of poor operation can usually be traced to a defective tube or diode.

3-3. Weak harmonic output and noise are symptoms usually indicating a defective diode. The replacement diode should have a high front to back resistance ratio if optimum results are to be realized.

3-4. TROUBLESHOOTING (Refer to Figure 1.)

3-5. Ensure that the Sweep Generator is operating properly before starting troubleshooting procedure.

3-6. Figure 2 provides typical waveforms present at the various test points indicated on the schematic diagram.

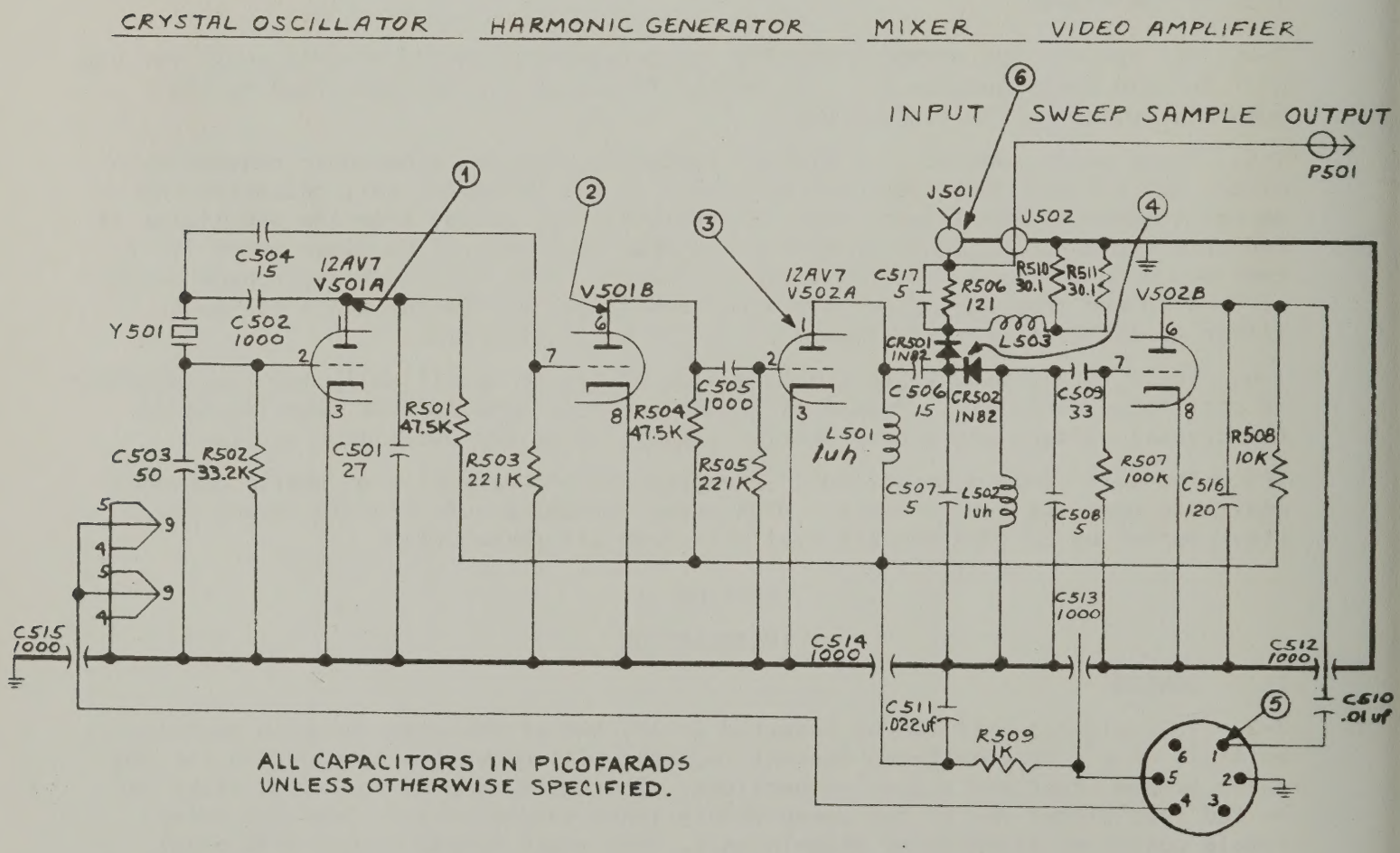


Figure 1. Schematic

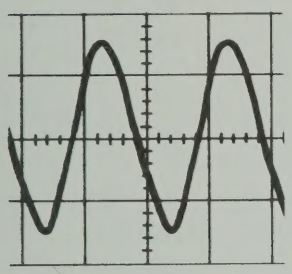
3-7. Adjust the Sweep Generator controls as follows:

a. SWEEP RATE - LINE
b. RF FUNCTION - SWEEP
c. MONITOR - RF 1
d. LEVEL - Adjust for 1V output
e. SWEEP WIDTH - 600 KHz
f. 0.1 MARKER SW - ON
g. POWER - ON
h. SWEEP RATIO - EQUAL
i. PLUG-IN SWEEP GENERATOR FREQUENCY - 10 MHz

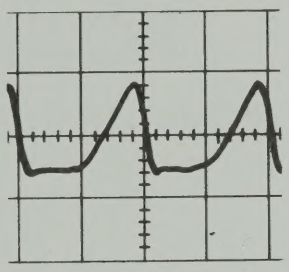
NOTE

The Telonic VR-2M Plug-in Sweep Generator was used to obtain the indicated waveforms.

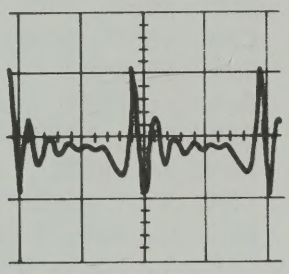
3-8. Adjust oscilloscope as indicated under the waveform.



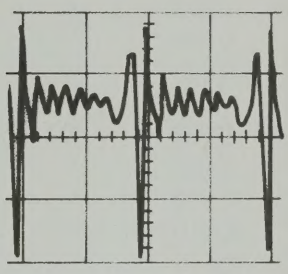
TEST POINT 1
Scale Level +40V
Vert. Sensitivity
1V/cm
Horizontal Sweep
.1 μsec/cm
Trigger-internal



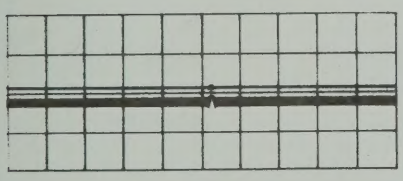
TEST POINT 2
Scale Level +50V
Vert. Sensitivity
.5V/cm
Horizontal Sweep
.1 μsec/cm
Trigger-internal



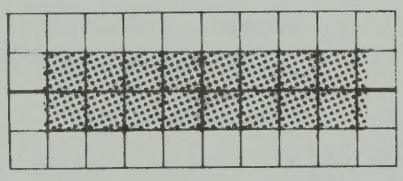
TEST POINT 3
Scale Level +95V
Vert. Sensitivity
.2V/cm
Horizontal Sweep
.1 μsec/cm
Trigger-internal



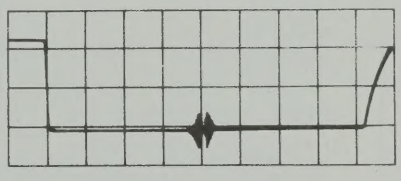
TEST POINT 4
Scale Level 0V
Vert. Sensitivity
.05V/cm
Horizontal Sweep
.1 μsec/cm
Trigger-internal



TEST POINT 5
Scale Level 0V
Vert. Sensitivity
.005V/cm
Horizontal Sweep
5ms/cm
Trigger-line



TEST POINT 6
Scale Level 0V
Vert. Sensitivity
.01V/cm
Horizontal Sweep
5ms/cm
Trigger-line



Sweep Generator Output with marker birdy indication.

Figure 2. Waveforms

SECTION IV

PARTS LIST

4-1. GENERAL.

4-2. ELECTRICAL PARTS LIST. Table 4-1 provides the complete electrical parts list for the CDH-10.0 MHz-X1 HARMONIC MARKER.

TABLE 4-1

Electrical Parts List		
Circuit Reference No.	Description	Telonic Part No.
C501	CFM, 27pf, 500V	MC-704
C502	CFM, 1000pf, 500V	MC-708
C503	CFM, 50pf, 500V	MC-706
C504	CFM, 15pf, 500V	MC-703
C505	Same as C502	
C506	Same as C504	
C507	CFM, 5pf, 500V	MC-700
C508	Same as C507	
C509	CFM, 33pf, 500V	MC-705
C510	CFM, 0.01µf, 500V	MC-709
C511	CFP, 0.022µf, 600V	MC-710
C512	CFCF, 1000pf, 1000V	MC-711
C513	Same as C512	
C514	Same as C512	
C515	Same as C512	
C516	CFM, 120pf, 500V	MC-707
C517	Same as C507	
CR501	DS, 1N82A/USA	MC-300
CR502	Same as CR501	
J501	Connector, Recept., UG625/U	J-7
J502	Connector, Terminating, MX1684A/U	J-54
L501	IF, RF, 1.0µH	MC-501
L502	Same as L501	
L503	IF, RF, (SC)	
P501	Connector, Plug, UG88C/U	J-13
R501	RMF, 47.5KΩ, ±1%, 1/2W	MC-103
R502	RMF, 33.2KΩ, ±1%, 1/2W	MC-105
R503	RMF, 221KΩ, ±1%, 1/2W	MC-106
R504	Same as R501	
R505	Same as R503	
R506	RMF, 121Ω, ±1%, 1/2W	MC-100

TABLE 4-1 (Cont)

Circuit Reference No.	Description	Telonic Part No.
R507	RMF, 100KΩ, ±1%, 1/2W	MC-104
R508	RMF, 10KΩ, ±1%, 1/2W	MC-102
R509	RMF, 1KΩ, ±1%, 1/2W	MC-101
R510	RMF, 30.1Ω, ±1%, 1/2W	MC-107
R511	Same as R510	
	Holder, Diode (2 required)	S-9
	Socket, Crystal	S-18
	Socket, Tube, 9 Pin (2 required)	S-58
	Shield, Tube, 9 Pin (2 required)	S-60
	Plug, Wafer (2 required)	S-12
V501	TE, JAN/12AV7	MC-600
V502	Same as V501	
Y501	Crystal, 10.0 MHz	X-1-10.0

ABBREVIATION CODE

CFCF	Capacitor, Fixed, Ceramic, Feed-Thru
CFM	Capacitor, Fixed, Mica
CFP	Capacitor, Fixed, Paper
DS	Diode, Semiconductor
IF	Inductor, Fixed
RMF	Resistor, Metal Film
TE	Tube, Electron